

E.M.P. ENGINEERED MACHINED PRODUCTS, INC.

Engine cooling and lubrication pumps have been mechanically driven since the introduction of engines. Pump output is tied to engine speed, requiring pressure relief valves and restriction valves to control the flow of the fluid. The inherent flaws of current systems are hydraulic inefficiency and the failure to provide the level of fluid control required for system optimization.

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THERMAL MANAGEMENT TECHNOLOGIES FOR THE 21ST CENTURY

E.M.P. has been working with the National Automotive Center (NAC) to commercialize controllable component and system technologies for military vehicles that reduce parasitic energy consumption and enable precision control of vehicular thermal systems. E.M.P. is currently integrating these technologies into medium and heavy duty military and commercial vehicles.

E.M.P. has developed an Integrated Thermal Management System (ITMS). ITMS features electrically driven variable speed components including cooling pumps, diverter valves, fans, and lubrication pumps. Variable speed component control, independent of engine speed, enables "on-demand" thermal control strategies. E.M.P.'s approach has been to develop the most efficient components to decrease current draw and make the components cost-effective.

ELECTRIC COOLING PUMP TECHNOLOGY

E.M.P. has developed electric pumps of numerous capacities for applications in primary and secondary cooling systems. The controllable electric pumps are used as main engine cooling, Charge Air Cooling (CAC), EGR cooling, Transmission Cooling, and HVAC systems. The pumps feature brushless, sensorless motor designs integrated with high efficiency hydraulic designs.

ELECTRIC POSITIVE DISPLACEMENT PUMP TECHNOLOGY

Originally conceived as a replacement for the mechanically driven engine lubrication pumps, the electrically driven positive displacement pump has many applications beyond lube oil distribution. Similar pump designs are finding applications in fuel systems, transmissions, axles, and high restriction coolant systems, including military hybrid vehicles.

ELECTRIC FLOW CONTROL VALVES

The electric flow control valve replaces the thermally actuated thermostat in the cooling system providing a low restriction cooling flow diverter that is electronically controlled based on custom engine temperature profiles.

The current thermostats tend to be highly restrictive and operate based on engine water outlet temperature by blocking flow to the radiator until the coolant reaches the desired operating temperature. This technology may be applied to vehicle thermal signature disguise, which protects our troops in the field.

ELECTRIC AIR PUMP OR BLOWER

This high efficiency mixed-flow blower is capable of high flow at moderate restrictions. The blower has applications replacing conventional fans on heat exchangers, HVAC systems, brake cooling, bilge evacuation and many more. The blower is designed to accommodate both brush and brushless motor technologies.

ITMS CONTROL SYSTEMS

The above-mentioned components are linked with a single controller and operated under custom control algorithms to minimize energy consumption while maintaining thermal system performance. ITMS integrated control ensures the maximum effectiveness of each component's performance as a function of other components in the system. This dependant control provides better thermal control and maximizes system efficiency. As the U.S. Army strives to meet its Transformation goals, E.M.P.'s partnership with the NAC incorporates the use of thermal energy management as a method to reduce installed and operational costs.



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